Plant Development

Guest Editors

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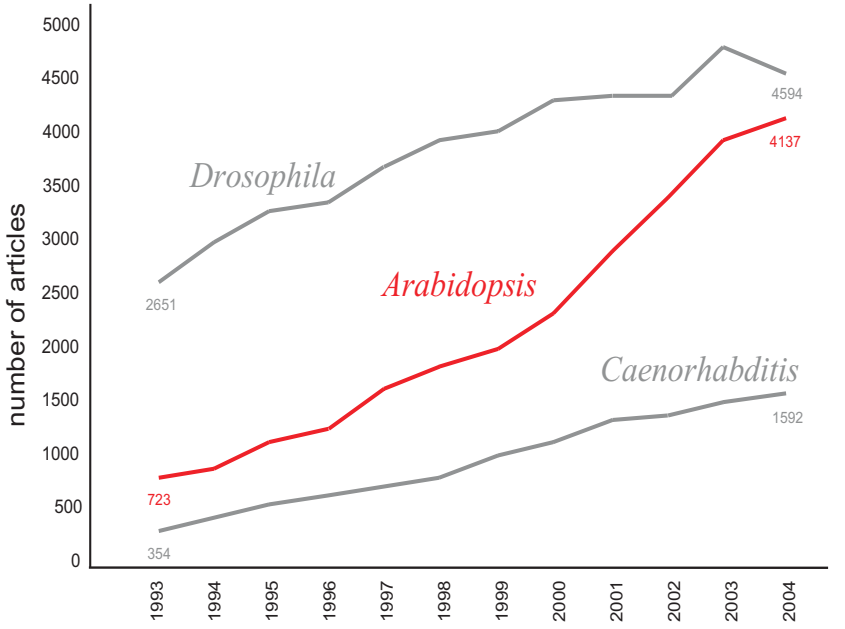

A comparison of the number of publications per year containing the words Arabidopsis, Drosophila *or* Caenorhabditis *in article titles, abstracts and keywords, clearly illustrates the increase in the productivity and the size of the community of researchers working on* Arabidopsis thaliana. *Source: Web of Science (Thomson Scientific, USA; http://isiknowledge.com/wos).*

Preface

Plants develop and grow

The vast majority of papers published by *The International Journal of Developmental Biology* deal with animal development. In view of this, Juan Arechaga, its Editor-in-Chief, proposed a Special Issue on plant development, in an attempt to attract the attention of plant developmental biologists. We accepted his proposal and soon decided to give an overview of the State of the Art of plant developmental biology, with a special emphasis on the developmental mechanisms which are specific to the Plant Kingdom, those which plants do not share with animals.

One of the conclusions which can be drawn from comparative analyses of plant and animal developmental mechanisms is that they have evolved independently. Although plants and animals use a similar logical plan in many developmental processes, they use different tools, i.e. molecules which are unrelated or represent novel rearrangements of ancient domains (1,2). A very clear example is the recently proposed paradigm for the role of the plant hormone auxin as a plant-specific solution for the generation of morphogenetic gradients in embryonic and post-embryonic development (3). Several reviews in this Special Issue are focused on how plants deal with problems which animals have resolved independently, such as the interplay between growth and differentiation, growth maintenance based on a pool of stem cells, the construction of a mechanism for time measurement, the correct localization of organs and their identity, and the control of their shape and size. But plants have also been forced to invent complex developmental processes, such as those which allow the monitorization and use of environmental cues (mainly light and temperature) to switch between alternative developmental programmes, which are also reviewed in several papers in this Special Issue.

We have also included a number of reviews on emergent topics within plant development, a few of which are also relevant to the biology of animals. Such is the case of the regulation of development by microRNAs, epigenetic control of gene expression, RNA processing and long-distance signalling among others. These reviews allude to phenomena which have been uncovered relatively recently and constitute mechanisms of regulation of development in different multicellular organisms.

Since *Arabidopsis thaliana* is a key topic when it comes to talking about plant biology, its presence in many of the pages of this Special Issue should not come as a surprise. This model species has a growing impact in the scientific literature on plant development, on plant biology and on developmental biology as a whole (see figure opposite). The advantage of working with such a model plant is also underscored by the enormous progress that is being made in recent years thanks to the combination of genomic tools and the invaluable resource which natural variation represents in a genetically tractable system, as pointed out in two articles in this Special Issue.

Finally, we would like to warmly thank all the authors who have contributed to this Special Issue, as well as the Editorial Office Team of *The International Journal of Developmental Biology,* for their excellent work, which made the making of this Special Issue easy, enjoyable and fruitful.

José Luis Micol and Miguel A. Blázquez

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(1) Meyerowitz, E.M. (2002). Plants compared to animals: the broadest comparative study of development. *Science* 295: 1482-1485. **(2)** Sablowski, R. (2004) Plant and animal stem cells: conceptually similar, molecularly distinct? *Trends Cell Biol.* 14: 605-611. **(3)** Willemsen, V. and Scheres, B. (2004). Mechanisms of pattern formation in plant embryogenesis. *Annu. Rev. Genet.* 38: 587-614.